REMARKS

In response to the objection to the Abstract of the Disclosure, a revised Abstract, which is less than 150 words in length, is attached hereto on a separate page as required. Accordingly, reconsideration and withdrawal of this ground of objection are respectfully requested.

Claims 1-17 have been rejected under 35 U.S.C. §112, second paragraph, for failing to particularly point out and distinctly claim the invention, based on a formal issue identified in item 4 on pages 2 and 3 of the Office Action. In response to this ground of rejection, Applicants have amended Claim 1 to replace the word "it" with the phrase "the vehicle". Accordingly, Claim 1, and therefore Claims 2 through 17, are now believed to be clear and definite, and reconsideration and withdrawal of this ground of rejection are respectfully requested.

Claims 1-9, 11, 12 and 14-17 have been rejected under 35 U.S.C. §103(a) as unpatentable over Bergan et al (U.S. Patent No. 6,204,778) in view of Obradovich (U.S. Patent No. 6,982,635). In addition, Claim 10 has been rejected as unpatentable over the same two references, and further in view of Letkomiller et al (U.S. Patent No. 6,369,712), and Claim 13 has been rejected as unpatentable over the same two patents and further in view of Lemelson (U.S. Patent No. 5,364,205). However, for the reasons set forth hereinafter, Applicants

respectfully submit that all claims which remain of record in this application, including new Claims 18 and 19, distinguish over the cited references, whether considered separately or in combination.

The present invention is directed to a curve rollover warning system for vehicles. In particular, the invention provides a method for generating a warning to the operator of a vehicle when the projected speed of the vehicle over a segment of the road ahead exceeds a computed maximum safe speed at any point within such road segment. Thus, as defined, for example in Claim 1, in the method according to the invention, for each present position of a vehicle as it travels along a road, a future speed of the vehicle is determined as a function of future position of the vehicle on the road, for each of a plurality of points that are distributed throughout the segment ahead. This forecast of future vehicle speed is computed based on an assumption regarding the driving behavior of the operator of the vehicle relative to statistical speed data for vehicles traveling the road segment in question.

Correspondingly, for each present location of the vehicle on the road, a computation is performed to determine the maximum safe speed of the vehicle at each of the plurality of points in the road segment forward of the vehicle, based on a maximum permissible lateral acceleration, on the road geometry, and on physical parameters of the vehicle. A rollover warning is then generated for any current position of the vehicle on the road, at which the forecast future speed for

at least one particular point on the road segment in question exceeds the determined safe speed at the same particular point.

These features of the invention are recited in each of independent Claims 1 and 18. In addition, Claim 4 further specifies that the future vehicle speed is forecasted based on the assumption that the driver of the vehicle will maintain the vehicle speed at the same percentile position relative to the statistical speed data throughout the road segment forward of the vehicle.

The latter features of the invention are not taught in the cited references. In particular, Bergan et al discloses a traffic monitoring and warning system in which a set of sensor arrays is disposed above or below a traffic lane approaching a hazard. The sensors provide signals which are indicative of the speed of the vehicle. A processor uses the output of the sensors to compute the actual speed of the truck which is compared with a computed maximum safe speed for the truck. If the computed actual speed of the truck exceeds the computed maximum safe speed, a signaling device is activated to warn the driver. (See, for example, Abstract; Column 10, line 59 through Column 11, line 26; etc.)

The operation of one embodiment of the Bergan et al system is illustrated in Figure 6, which shows an exit ramp 60 departing from a highway 61, which includes a substantially curved portion 62. Ahead of the curved portion a first pair of sensors 64 and 64a, and a second pair of sensors 65 and 65a are arranged

upstream of electronic message signs 68 and 68a. (In addition, an optional third set of sensors 66, 66a may also be provided.) The specification at Column 24, lines 6-34, referenced in item 6 on page 3 of the Office Action states that in use, a processor uses the data from the sensor 64, 65 and 66 to compute deceleration between the sensors and to predict the speed at which the truck will be traveling "when it arrives at the curve 62". If this predicted speed (of the truck when it arrives at the curve 62) exceeds a maximum safe threshold speed (also computed by the processor), the processor activates the message sign to display a warning, such as "slow down!".

As is apparent from the foregoing brief description of the Bergan et al system, it differs from the present invention in important respects. For example, Claim 1 recites that, for each present position of the vehicle as it travels over the road segment in question, its future speed is forecast "based on an assumption regarding a driving behavior of an operator of said vehicle relative to statistical speed data for vehicles traveling said road". In Bergan ete al on the other hand, insofar as the cited portion of the specification discloses, it appears that the speed of the vehicle "when it arrives at the curve 62" is predicted simply by extrapolating the deceleration of the vehicle between the two or three sets of inroad sensors. Nothing contained in Bergan et al teaches or suggests that the driving behavior of the operator of the vehicle relative to statistical speed data

for vehicles traveling on the road in question is in any way involved in determining the speed of the vehicle when it reaches that particular point.

More specifically, Claim 4 recites that the vehicle speed is forecasted based on the assumption that the driver of the vehicle will maintain the vehicle speed at the same percentile position relative to the statistical speed data throughout the road segment forward of the vehicle. This additional feature is also neither taught nor suggested in Bergan et al.

Finally, in the method of Claim 1, at each present position of the vehicle as it travels the road, its future speed is forecast "for each of a plurality of points that are distributed throughout a segment of said road forward of the vehicle", and the maximum safe speed of the vehicle for each of the same points is also determined. By way of contrast, insofar as Applicants have been able to determine, the only disclosure in Bergan et al which suggests any forecast or prediction is that referred to previously, in which the vehicle deceleration is computed in order to determine the speed at which the vehicle "will be traveling when it arrives at the curve 62". Whether or not a warning is displayed is thus determined solely on the basis of whether the predicted speed at that location exceeds a maximum safe threshold speed.

The latter feature of the invention is said to be disclosed in Obradovich which provides a system for assisting vehicle users to operate a vehicle safely

and effectively (Column 1, lines 15-17), taking into consideration the vehicle condition, the surrounding conditions, and the driver condition. (See Column 2, lines 23-26.) For this purpose, Obradovich provides a system of tests to determine the cognitive state of the user of the vehicle (Column 2, lines 40-42), as well as the vehicle condition and the surrounding road conditions. Based on the latter information, in one embodiment of the apparatus, a driving program may be downloaded from a remote server, which demonstrates to the user how to operate the vehicle in response to an upcoming driving situation.

The latter feature of the Obradovich system is illustrated in Figure 18, referred to at page 4 of the Office Action, and is discussed at Column 18, lines 24-61. In particular, as is illustrated in Figure 18, when the driver of a vehicle approaches a curved segment 1503 the system recommends that the operator of the vehicle operate it so as to follow the arc 1507 through the curve.

The Office Action indicates that Obradovich discloses that, at each present position of the vehicle, a maximum safe speed of the vehicle is determined for each of a plurality of points on the road forward of the vehicle, based on a maximum lateral acceleration, on road geometry and on physical parameters of the vehicle. Applicants have carefully examined the disclosure, including in particular the portions referred to at Column 13, lines 26-40 and Column 18, lines 24-61 and have been unable to identify any such disclosure. In particular, Applicants respectfully submit that Obradovich does not teach or suggest a

method such as defined in Claims 1 and 18, in which the future speed of the vehicle is forecasted "as a function of future position of said vehicle on said road, for a plurality of points that are distributed throughout a segment of said road forward of said vehicle". Applicants respectfully submit that the cited portions of the specification in Obradovich do not mention forecasting speed of the vehicle at any point within the curve 1503 or the arc 1507.

Finally, Applicants also note that Obradovich fails to teach those features of the invention as defined in Claims 1 and 18 which are missing in Bergan et al, as described above. In particular, it contains no disclosure which suggests forecasting the speed of the vehicle based on an assumption regarding the driving behavior of the operator of the vehicle relative to statistical data for vehicles traveling the road segment in question. Accordingly, Applicants respectfully submit that the present invention as defined in Claims 1 and 18 distinguishes over the cited combination of Bergan et al and Obradovich.

The Letkomiller et al patent, on the other hand, is cited only in respect of Claim 10, as disclosing a system which takes into account fuel consumption of the vehicle, while the Lemelson patent is cited in regard to Claim 13, as disclosing remedial action in the form of an automatic slowing of the vehicle. Applicants respectfully submit that neither of these references teaches or suggests those features of the invention, discussed above, which are missing in both Bergan et al and Obradovich.

In light of the foregoing remarks, this application should be in consideration for allowance, and early passage of this case to issue is respectfully requested. If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #095309.52468US).

Respectfully submitted,

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